REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Official Action dated October 14, 2004. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

Claims 1, 3-8, 10-16, and 18-32 are under consideration in this application. Claims 2, 9, and 17 are being cancelled without prejudice or disclaimer. Claims 1, 3-8, 10-16, and 18-20 are being amended, as set forth above, in order to more particularly define and distinctly claim Applicants' invention. New claims 21-32 are being added to recite other embodiments described in the specification.

Additional Amendments

The claims are being amended to correct formal errors and/or to better disclose or describe the features of the present invention as claimed. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

Claims 1-3, 11, and 16-19 were rejected under 35 U.S.C. § 102(e) as being anticipated by different portions of U.S. Pat. No. 6,297,122 to Eguchi et al. (hereinafter "Eguchi"), and claims 4-10, 12-15 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Eguchi in view of U.S. Pat. App. Pub. No. 2001/0006838 to Won (hereinafter "Won") and U.S. Pat. No. 6,617,248 to Yang (hereinafter "Yang"). The references Vaartstra (6,281,125), Ochiai (6,287,934), and Won (Pub. 2001/0031527) were cited as pertinent to the invention. These rejections have been carefully considered, but are most respectfully traversed.

The fabricating method of a semiconductor integrated circuit device of the invention, as now recited in claim 1, comprises forming a bottom electrode (p. 19, line 7) of a capacitor with high-k material on a semiconductor substrate by a chemical vapor deposition method in a sub-atmospheric pressure using an organoruthenium compound as a precursor, which includes the steps of: providing the semiconductor substrate in a deposition chamber;

increasing a temperature of the semiconductor substrate in the chamber up to a desired temperature; separately supplying the precursor and an oxidation gas into the deposition chamber to form a ruthenium film for the bottom electrode with a desired thickness on the heated semiconductor substrate, said oxidation gas being separately supplied to said deposition chamber by a supplying system different from a precursor supplying system and only during when the precursor being supplied ("*The forgoing process is characterized in that the supply of an oxygen gas is limited to when the precursor is supplying during formation of a bottom electrode of ruthenium*" p. 21, lines 18-20); stopping the supply of the precursor and said oxidation gas; and decreasing the temperature of the semiconductor substrate (page 18, lines 23-24). The bottom electrode essentially consists of ruthenium ("a *bottom electrode of ruthenium i.e., the deposition period*" p. 19, line 7; "*the reaction of the gases and the oxygen for Ru disposition*" p. 20, lines 5-6). The underlined features allow forming a bottom electrode of ruthenium with a lesser amount of oxygen contamination than the detection limit of a TDS method such that it will not oxidize a barrier film (p. 19, lines 21-23).

The invention is also directed to fabricating method of a semiconductor integrated circuit device comprising forming a top electrode essentially consisting of ruthenium ("*a top electrode of ruthenium*" p. 22, line 15) of a capacitor of the invention, as now recited in claim 21, which is similar to claim 1, except that the oxidation gas is supplied to said deposition chamber during when the substrate temperature is increased, when the precursor is supplied, and when the substrate temperature is decreased. The underlined features allow forming a top electrode of ruthenium by inhibiting an increase in the leakage current due to the reduction of a high-k dielectric film of a capacitor (p. 22, lines 18-21).

Applicants respectfully contend that neither Eguchi nor Yang, or their combination as relied upon by the Examiner, teaches or suggests the features of Claim 1: supplying an oxidation gas separately from the supply of the precursor into a deposition chamber and **only during** the precursor-supplying step for forming a bottom electrode (p. 22, line 15) essentially consisting of ruthenium of a capacitor; or Claim 21: supplying an oxidation gas separately from the supply of the precursor into the deposition chamber and **during** the substrate temperature increasing and decreasing steps and the precursor-supplying step for forming a top electrode essentially consisting of ruthenium of a capacitor.

In contrast, Eguchi forms a bottom electrode 103 of ruthenium of a capacitor with a high-k material essentially consisting of $SrRuO_3$ (rather than Ru). Specifically, Eguchi

purposefully produces a metal **oxide** (SrRuO3; col. 5, lines 5-6; Fig. 1B) electrode, i.e., **promoting** the O contents therein, while the invention deliberately provides a metal (Ru) electrode and **reduces** the possibility for O elements oxidized onto the surface of the metal (Ru) electrode. It is well established that a rejection based on cited references having contradictory principles or principles that teach away from the invention is improper.

Further, after the supply of the source gases is stopped, during the substrate cooling period, Eguchi keeps supplying O_2 gas to form $SrRuO_3$ film 103 for the bottom electrode 103 (col. 5, line 67- col. 6, line 8; also the lower/bottom electrode 303 in Fig. 7D; col. 12, lines 35-36), rather than just during precursor-supplying step. Regarding forming a top electrode 305 (Fig. 7D; col. 12, lines 38-39), Eguchi fails to supply an oxidation gas during the substrate–temperature increasing step (col. 5, lines 26-33; col. 12, lines 31-34).

Won discloses some organoruthenium compound. However, Won does not teach or suggest (1) supplying an oxidation gas separately from the supply of the precursor into a deposition chamber and **only during** the precursor-supplying step for forming a bottom electrode essentially consisting of ruthenium of a capacitor; or (2) supplying an oxidation gas separately from the supply of the precursor into the deposition chamber and **during** the substrate temperature increasing and decreasing steps and the precursor-supplying step for forming a top electrode essentially consisting of ruthenium of a capacitor.

Yang only discloses annealing, but not the above-mentioned features (1) and (2). In addition, Yang shares the same deficiency by internationally forming a RuO_2 film (rather than a Ru film).

Applicants contend that neither cited prior art reference, nor their combination teaches or suggests each and every feature of the present invention as disclosed in independent claims 1 and 21. As such, the present invention as now claimed is distinguishable and thereby allowable over the rejections raised in the Office Action. The withdrawal of the outstanding prior art rejections is in order, and is respectfully solicited.

Conclusion

In view of all the above, clear and distinct differences as discussed exist between the present invention as now claimed and the prior art reference upon which the rejections in the Office Action rely, Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and telephone number indicated below.

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